

CLAIMS:

1. A method for the treatment of gaseous chemical waste which comprises the steps of:

5 continuously circulating water through an essentially closed loop incorporating a gas scrubbing unit and an ion absorption unit comprising a water permeable ion absorbing means;

feeding exhaust gas or a reaction product thereof to the gas scrubbing unit for dissolution in the circulating water thereby to form an aqueous solution containing ionic species derived from the exhaust  
10 gas;

continuously bringing the circulating water into contact with the ion absorbing means in the ion absorption unit while applying an electrical potential across the thickness of the ion absorbing means  
15 and removing from the ion absorption unit a more concentrated aqueous solution of the ionic species; and

continuously adding to the closed loop a quantity of water corresponding to the quantity of aqueous solution of the ionic species removed from the ion absorption unit.

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2. A method according to claim 1, wherein the ion absorbing means comprises a water permeable layer of an ion absorbing material.

3. A method according to claim 2, wherein the continuously circulating water is brought into contact with one surface of the layer of ion absorbing material in the ion absorption unit and the more concentrated aqueous solution of the ionic species is removed via the other surface of the layer.

4. A method according to claim 1, wherein the ion absorbing means comprises a water permeable zone of an ion absorbing material.

5. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof is fed continuously to the gas scrubbing unit.

6. A method according to any of claims 1 to 4, wherein the exhaust gas or the reaction product thereof is fed intermittently to the gas scrubbing unit.

7. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof contains HF and the ionic species is  $F^-$ .

8. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof contains HCl and the ionic species is  $\text{Cl}^-$ .

5 9. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof contains oxides of nitrogen and the ionic species is  $\text{NO}_3^-$ .

10 10. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof contains oxides of sulphur and the ionic species is  $\text{SO}_4^{2-}$ .

15 11. A method according to any preceding claim, wherein the exhaust gas or the reaction product thereof contains oxides of phosphorus and the ionic species is  $\text{PO}_4^{3-}$ .

12. Apparatus for use in carrying out the method of claim 1, comprising

20 an essentially closed loop circulation system containing a gas scrubbing unit and an ion absorption unit comprising a water permeable ion absorbing means and means for enabling an electrical potential to be applied across the thickness of the ion absorbing means;

a pump for continuously circulating water around the closed loop;  
an inlet for exhaust gas or a reaction product thereof into the gas scrubbing unit;  
an inlet for water into the closed loop circulation system; and  
5 an outlet for concentrated aqueous solution of ionic species from the ion absorption unit.

13. Apparatus according to claim 12, wherein the ion absorbing means comprises a water permeable layer of an ion absorbing  
10 material.

14. Apparatus according to claim 12, wherein the ion absorbing means comprises a water permeable zone of an ion absorbing  
material.

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15. Apparatus according to any of claims 12 to 14, which comprises also within the closed loop circulation system one or more heat exchangers, filters and/or hydrocyclones.